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October 28, 2003

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RE: Patentability Search "Methods and Systems For Predicting Software Defects In An Upcoming Software Release"

Your Ref: 14846-36

Our Ref: SANDLER-20067

Dear Mr. Morgan:

Further to your instructions of October 21, 2003 a patentability search has been conducted on the above identified subject matter.

Objective:

The objective of the search is to locate references disclosing a method to forecast the number of software defects for an upcoming software release by evaluating the relative size of the upcoming release respect to a baseline software release and estimating the number of expected defects based on the relative size of the upcoming release and the number of observed software defects for the baseline release. The method may include consideration of regression defects that were detected in the previous release as well as any code re-factoring.

Results of the Search:

Your attention is particularly directed to the following:

U.S. Patent Number 6,073,107 to Minikiewcz et al which discloses parametric software forecasting systems and methods, which are especially adapted to estimate object oriented system development costs, which utilize a plurality of non-cost based input parameters. These include development complexity, organizational practices and productivity, specification level and size. Software size can be reflected by specification of object-related characteristics of the proposed system to form an object oriented size

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metric. One useful metric is based on calculating predictive object points. Alternately, other size metrics such as number of lines of code or number of function points can be used alone or in combination with object oriented metrics. In response to the specified characteristics an object oriented metric, indicative of the complexity of the proposed system, can be determined. The size metric, for example based on predictive object points, is in turn made available to an analysis engine for production of labor and cost estimates. See column 1, lines 40 - 52.

U.S. Patent Number 6,477,471 to Hedstrom et al which discloses a method and statistical tool apparatus for predicting defects in products. The method according to one embodiment includes the step of providing historical data of defects at different stages of development and a value representing a goal for escaping defects. Also provided is the planned total number of opportunities for defects. The goal for number of escaping defects and planed number of opportunities for defects are backsolved to determine the total number of defects. The total defects are distributed as a function of the historical data to provide prediction of defects at the different stages of development. See column 2, lines 19 - 30.

U.S. Patent Number 6,546,506 to Lewis which discloses a system, method, and computer program product for estimating test phase duration. This technique comprises: obtaining productivity information for a software project to be tested, this productivity information comprising an average number of hours required for executing a test scenario, an average number of hours required for identifying and documenting a defect, and a productivity factor of test personnel; obtaining input values for the software project, these input values comprising a projected number test scenarios, a projected number of defects, and a projected number of test personnel; computing a number of weekly hours available for work; and generating the software test plan using the obtained productivity information and the obtained input values. Generating the test plan further comprises: computing a duration of the testing of the software project when the duration is not known; and computing a risk factor for the testing when the duration is known. See column 2, lines 30 - 55.

The following references have been found as being of interest:

<u>Patent Number</u>	<u>Inventor</u>	<u>Date Issue</u>
5,446,895	White et al.	08/29/1995

5,655,074	Rauscher	08/05/1997
5,758,061	Plum	05/26/1998
5,903,897	Carrier III et al.	05/11/1999
5,960,196	Carrier III et al.	09/28/1999
6,363,524	Loy	03/26/2002
6,405,364	Bowman-Amuah	06/11/2002
6,513,154	Porterfield	01/28/2003
6,519,763	Kaufer et al.	02/11/2003
6,601,017	Kennedy et al.	07/29/2003
6,601,018	Logan	07/29/2003
6,601,233	Underwood	07/29/2003
6,626,953	Johndrew et al.	09/30/2003
6,629,266	Harper et al.	09/30/2003
2002/0147961	Charters et al.	10/10/2002
2002/0162090	Parnell et al.	10/31/2002
2003/0018952	Roetzheim	01/23/2003
2003/0033586	Lawler	02/13/2003
2003/0188290	Corral	10/02/2003
2003/0196190	Ruffolo et al.	10/16/2003

Literature

"Integrating metrics and models for software risk assessment," J.P. Hudepohl

"Reliability Analysis of Large Software Systems: Defect Data Modeling," Y. Levendel, pp. 141-152, IEEE transactions on Software Engineering.

"An Analysis of Several Software Defect Models," T.-J. Yu, V.Y. Shen, H.E. Dunsmore, IEEE transactions on Software Engineering., pp. 1261-1270

"Understanding the Sources of Software Defects: A Filtering Approach," Claes Wohlin, Martin Höst, Magnus C. Ohlsson , 8th International Workshop on Program Comprehension (IWPC'00), June 10 - 11, 2000

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"Gauging Software Readiness with Defect Tracking," Steve McConnell, IEEE Software, pp. 136,135

"Defect Prevention through Defect Prediction: A Case Study at Infosys," Sanjay Mohapatra; B. Mohanty , Utkal University, IEEE International Conference on Software Maintenance (ICSM'01), November 07 - 09, 2001, p. 260

"Understanding and predicting the process of software maintenance releases," Basili, L. Briand, S. Condon, Yong-Mi Kim, W.L. Melo, J.D. Valen , Inst. for Adv.; 18th International Conference on Software Engineering (ICSE'96), March 25 - 29, 1996, p. 464

"A Critique of Software Defect Prediction Models," Norman E. Fenton, Martin Neil; IEEE Transactions on Software Engineering; pp. 675-689

The field of search was directed to the following areas:

<u>Class</u>	<u>Subclasses</u>
715	511
716	101, 120, 124, 130, 135, 170
702	182
714	37, 38, 704

The field of search also included a search for literature on spi.org and IEEE computer.org.

Examiner Robert Beausoliel in art unit 2184 was consulted regarding the areas of search in classes 714, 702 and 717.

One set of references is enclosed and your disclosure is returned.

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If we may be of any further service, please advise.

Thank you for giving us an opportunity to be of service to you.

Very truly yours,

A handwritten signature consisting of stylized initials and a surname, written in black ink.

Israel Agranov, Ph.D.
Senior Vice President

IA/RR/ss

Enclosures